1983 D.A.T.E. PROGRAM REPORT

STAFF SUPERVISED AGRICULTURAL DEMONSTRATION PROJECTS

Province of British Columbia
Ministry of Agriculture and Food

RC
D3
B
.B5
C.2

British Columbia Cataloguing in Publication Data

Main entry under title:
D.A.T.E. program report. -- 1974-

Annual.
On cover: 1975- , Staff supervised agricultural demonstration projects.
Issued 1974-1975, Dept. of Agriculture; 1976-1979, Ministry of Agriculture; 1980- , Ministry of Agriculture and Food.
ISSN 0706-9308 = D.A.T.E. program report

1. D.A.T.E. Program. 2. Agricultural research - British Columbia - Periodicals. I. British Columbia. D.A.T.E. Committee. II. British Columbia. Dept. of Agriculture. III. British Columbia. Ministry of Agriculture. IV. British Columbia. Ministry of Agriculture and Food.

S542.C3D23 630.72'0711

1983
D.A.T.E. PROGRAM REPORT

Demonstration of Agricultural Technology and Economics

Submitted by:

R. J. Miller (Chairman)
Executive Director
Specialist and Regulatory Services

I. C. Carne
Assistant Deputy Minister
Field Operations

M. G. Oswell
Executive Director
Production Services

British Columbia Ministry of Agriculture and Food

VICTORIA, B.C. 1983

CONTENTS

HIGHLIGHTS 1

RANGE SEEDING EQUIPMENT 3

PROPAGATION OF SELECTED VIRUS-FREE GRAPE VARIETIES USING A NEW TISSUE CULTURING TECHNIQUE 5

DEMONSTRATING USE OF ROP RECORDS FOR BEEF MANAGEMENT SYSTEMS 7

STIKINE VALLEY SEED VARIETY TRIALS 10

DEMONSTRATION OF EQUIPMENT FOR DEVELOPING ORGANIC WETLANDS 12

FORAGE IMPROVEMENT PROGRAM FOR VANCOUVER ISLAND 14

OVERWINTERING OF HONEYBEE QUEENS FOR COMMERCIAL USE AND PRODUCTION OF PACKAGE BEES 16

EVALUATION OF VEGETABLE CROPS IN THE CENTRAL REGION OF BRITISH COLUMBIA 18

THE APPLICATION OF INTEGRATED PEST MANAGEMENT TO LETTUCE PRODUCTION IN B.C. 21

EVALUATION OF HIGH-TENSILE HIGH-VOLTAGE ELECTRIC FENCES TO PROTECT FRUIT TREES AND HAYSTACKS FROM DEER AND ELK DAMAGE 23

WATER HARVESTER FOR DRYLAND RANGE 25

CHEMICAL CONTROL OF ONION WHITE ROT 27

FARMER USE OF VIDEO TAPE AGRICULTURAL PROGRAMS 28

HARVEST AID FOR LETTUCE, CAULIFLOWER, CABBAGE AND BROCCOLI 30

SOIL EROSION CONTROL WITH INTERCEPTOR DRAINS 32

DEMONSTRATION OF NEW APPLE VARIETIES FOR COASTAL CONDITIONS 34

DEMONSTRATION OF FREE-STALL MATS 36

DEMONSTRATION OF BEEF PRODUCTION ON IRRIGATED PASTURE AND THE USE OF HIGH TENSILE SMOOTH WIRE FENCING 37

ESTABLISHMENT AND MANAGEMENT OF A RANGELAND SEEDING 39

EVALUATION OF FORAGE VARIETIES IN THE PEACE RIVER 40

DEMONSTRATION OF THE PRODUCTION, ECONOMICS, AND MARKETING OF THE OYSTER MUSHROOM 42

DEMONSTRATION OF THE FEASIBILITY OF AN ONGOING PROGRAM TO IDENTIFY GRAPE VINE PLANTINGS IN THE OKANAGAN SUITABLE FOR VIRUS-TESTED PROPAGATION 44

AERATOR EVALUATION FOR ODOR CONTROL 46

EVALUATION OF A COMPUTERIZED APPLE SCAB PREDICTOR 47

EVALUATION OF TRICKLE IRRIGATION EQUIPMENT FOR INJECTING FERTILIZERS AND NEMATOCIDES 49

EVALUATION AND DEMONSTRATION OF LIVESTOCK AND POULTRY VENTILATION SYSTEMS 51

MINIMUM TILLAGE CEREAL CROP PRODUCTION SYSTEM 52

DEMONSTRATION OF SUBSURFACE DRAINAGE ON CRESTON FLATS 54

EVALUATION OF LIME ADDITIONS FOR FORAGE CROP PRODUCTION IN THE CENTRAL INTERIOR 56

THE ESTABLISHMENT OF A GRAPE VARIETY EVALUATION PLANTING ON VANCOUVER ISLAND 58

CLUBROOT RESISTANT CULTIVAR TRIALS 60

TO APPLY INTEGRATED INSECT AND DISEASE PEST MANAGEMENT TO POTATO PRODUCTION 62

POULTRY HEALTH PROGRAM 64

TERMS OF REFERENCE

The British Columbia Ministry of Agriculture and Food D.A.T.E program makes available funds to assist in the introduction of advanced agricultural and economic techniques to the food supply system.

1983 HIGHLIGHTS

The D.A.T.E. (Demonstration of Agricultural Technology and Economics) program continued in 1983 to fund projects aimed at demonstrating new advances in agricultural technology. Several projects, funded earlier under the program, have matured and have continued in one way or another to receive financial support and are proving their value to the industry.

Program Highlights:

- A control program for lettuce aphid was developed and implemented. As a result, no lettuce was rejected because of aphid infestation this year while in 1982 growers lost half the crop ($1 million) due to this pest.

- During the past few years, the range-seeding program, which began as a DATE project in 1975, resulted in the reseeding of 30,000 acres. Two range-seeding units, developed by the ministry, are now available to ranchers to seed depleted rangeland under a fee for service contract.

- A DATE project demonstrated the use of records of performance by producers for developing livestock management systems. It was proved that a 20 per cent increase in weaning weights over a five year period is an achievable goal for most management systems.

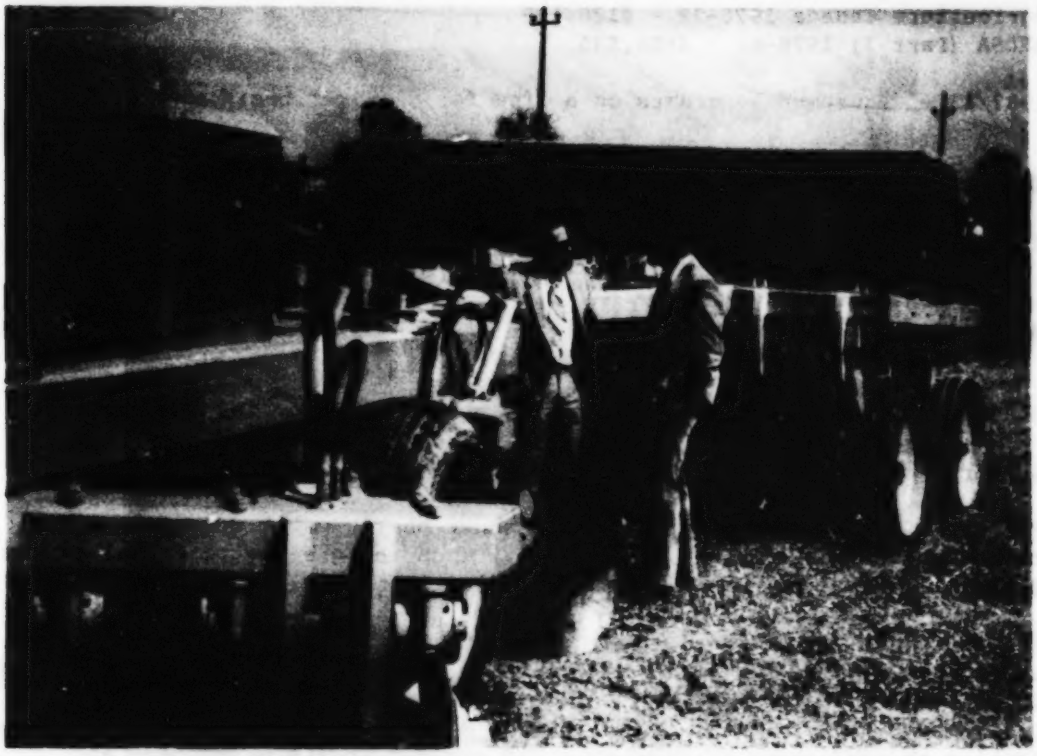
- A project to demonstrate to greenhouse vegetable growers that mites and whiteflies can be controlled with biological agents has resulted in the establishment of a private firm, Applied Bio-Nomics, which now produces biological control agents for growers across Canada and in the U.S.

- About 1,150 farmers have used video-tapes to help improve their production techniques. The tapes were made available in two ministry offices and were also used at field days and seminars.

- A vegetable harvest aid, designed by the Engineering Branch, reduces the harvesting time for lettuce cauliflower, cabbage and broccoli.

PROJECT: No. 34

RANGE SEEDING EQUIPMENT



Hon. Harvey W. Schroeder, Minister of Agriculture and Food (right) and Reg Miller, executive director, Specialist and Regulatory Services for the ministry, look over the range-seeding equipment.

Project Supervisors:

- T.A. Windt, E. Schulz, and L.G. Brown, Agricultural Engineering Branch staff, B.C. Ministry of Agriculture and Food
- A.H. Bawtree, Range Specialist, B.C. Ministry of Agriculture and Food

Co-operators:

- Agriculture Canada
- Range Division of the Ministry of Forests
- IMW Ltd. and Ranchers

Branches:

Engineering
Field Crops

Funding:

D.A.T.E. 1975-79 - $20,900
Field Crops 1975-76 - $10,258
Agriculture Canada 1976-79 - $120,129
ARDSA (Part I) 1978-82 - $806,535

1982/83 - Equipment operates on a "fee for service" basis

Objectives:

1. To develop and demonstrate the special equipment and seeding methods required to revegetate depleted rangelands.

2. To co-ordinate engineering and agronomics technology to increase range forage production.

3. To encourage private contractors to operate a range seeding service.

Summary:

The use of the seeding equipment has shown that gross production on the range can be increased by 400 to 500%. Thus the grazing potential of the 2 1/2 million acres (1 million hectares) of range is greatly increased.

The equipment developed consists of two units: a heavy duty offset disc, hydraulically loaded, and a free-floating seeder-packer. The equipment effectively eliminates unwanted vegetation, provides a good seed bed, places seed accurately at a 1/2 to 3/4 inches depth and provides adequate packing to firm seed into the soil for maximum soil seed contact and moisture retention.

Two range-seeding units are available to ranchers. These units have seeded range at 200 locations involving in excess of 12,000 hectares (30,000 acres).

During the 1983 season, ranchers supplying seed were charged $45 per acre to cover equipment costs. The funds so generated pay for a contractor, all operational costs and moving costs. Over the last two years the range-seeding program has been financially self-sufficient.

PROJECT: No. 77

PROPAGATION OF SELECTED VIRUS-FREE GRAPE VARIETIES USING A NEW TISSUE CULTURING TECHNIQUE

Some grape cuttings for the industry will be provided in 1983 from the plantings established with tissue cultured grape varieties.

Project Supervisor:

- John Vielvoye, Provincial Grape Specialist, B.C. Ministry of Agriculture and Food, Kelowna

Co-operators:

- R. Harris, Research Scientist Emeritus, Agriculture Canada, Sidney
- L. Denby, Research Scientist, Agriculture Canada, Summerland
- J.H. Stevenson, Research Technician, Agriculture Canada, Sidney

Branch:

Horticulture
Regional Extension Services, Okanagan-Kootenay Region

Funding:

81/81 - $10,000

Objectives:

1. Produce 100 plants each of 20 grape varieties using tissue culture

2. Establish these plants in a field nursery and grow them to sizeable transplants in 1980

3. Establish mother blocks of fully virus indexed grape plants with these plants in 1981

Summary:

Viruses can significantly reduce the yield and quality of grapes. It is most important that grape plants be virus free. In order to produce a large number of plants from a simple virus-free vine a new technique of tissue culturing was employed.

The fully certified grape planting established with tissue cultured grape varieties will produce some grape cuttings for the grape industry in 1983. This planting is the first in North America to contain a wide range of varieties propagated from tissue culture techniques to be used as a source of propagation material for the grape industry.

Publication of the procedures used in the tissue culture program in Vitis 21, 22 - 32 (1982) by R.E. Harris and J.H. Stevenson has received favourable world-wide review.

PROJECT: No. 78

DEMONSTRATING USE OF ROP RECORDS FOR BEEF MANAGEMENT SYSTEMS

It was demonstrated that beef producers who keep records of performance on their herds can use them for profitable cow calf production.

Project Supervisor:

- R.J. Richmond, Beef Cattle Specialist, B.C. Ministry of Agriculture and Food, Kamloops

Branch:

Livestock

Funding:

80/81 - $5,000

Objectives:

To demonstrate the use of ROP records for evaluating and developing livestock management systems.

Summary:

Only 5 per cent of beef producers keep records of performance on their beef herds and of these only a handful know how to use them. This study demonstrated how to use records.

Records from beef herds on ROP in British Columbia from 1977 to 1981 were analysed to 1) identify keys to profitable cow calf production and 2) to develop a herd management program.

Management Keys to Profitable Production

1. Choice of Breed - Average weaning weights for Angus, Shorthorn and Hereford breeds were 475 pounds. Commercial herds (unregistered straightbreds and crossbreds) average 504 pounds, and European breeds 561 pounds at weaning.

2. Calving Period - In the herds studied, 69 per cent of all calves born in the first 60 days of the calving period averaged 548 pounds at weaning. Calves born later averaged 471 pounds.

3. Culling Levels - The records show that on average 1 in 4 second calf heifers were culled from breeding herds. The primary reason has been poor conception due to low levels of nutrition.

4. Age of Dam - Weaning weights increased from 460 pounds for first calf to 540 pounds for calves from cows 6 to 9 years old and then fell rapidly.

5. Selection - Through selection of better breeding stock, annual increase in weaning weight has averaged 7.5 pounds for heifers, 9.5 pounds for steers and 5.9 pounds for bulls.

6. Sex of Calf - The adjusted 200-day weaning weight for heifer calves was 471 pounds, for steer calves 491 pounds and for bull calves 526 pounds.

In addition to the ROP study, management data was collected from a number of independent nutrition, implant and breeding trials conducted by the Livestock Branch and other agencies.

The result of these studies indicate:

7. Proper feeding of the cow before and after calving can affect weaning weights by as much as 50 pounds.

8. Hormone implanting at branding time can increase weaning weights by 16 to 24 pounds and implanting at birth and branding time can increase weaning weights to 40 pounds.

Production Potential

The cummulative effect of using the management keys can lead to increases

in weaning weights of 199 pounds. The weight of calf produced per cow bred can be increased by 159 pounds, assuming 80 per cent of cows bred wean calves.

Management Key	Potential Increase in Weaning Wt. (lb.)	Potential Increase in Weight of Calf/Cow Bred (lb.)
Choice of Breed	30	24
Calving period (60 days)	24	19
Culling levels		
- heifer nutrition	40	32
- age of dam	10	8
Selection	8	6
Sex of Calf	17	14
Nutrition	50	40
Implanting	20	16
	199	159

At 80 cents per pound for calves the accumulated economic effect is $127 per cow. Not all producers will realize this increase as it depends on the management level and starting point. However, a 20 per cent increase in weaning weights over a five year period is an achievable goal for most management systems.

Management Programs

Information from this project has been used in management extension and program development in the following areas:

1. Audio-visual aids - the information has formed the basis for a Knowledge Network Program and audio-visual tapes on Basic Herd Management now on loan to producers through regional offices.

2. Workshops - the information has served as basis of production sections of Financial Management Workshops.

3. Scientific presentations - the data were used extensively in a presentation and publication on Management Effects in Beef Production (Canadian Journal of Animal Science).

4. A Herd Management Program - has been developed for use on the Apple II and compatible mini computers. This program is being used by the ministry to assist producers in herd management. Copies of this program have also been distributed to producers and producer groups having access to private computers.

PROJECT: No. 81

STIKINE VALLEY SEED VARIETY TRIALS

Project Supervisor:

- C.G. Johnstone, District Agriculturist, B.C. Ministry of Agriculture and Food, Smithers

Co-operators:

- Bill Sampson, commercial grower
- Mark Stevens, C. Rietz and R. Bauer, Stikine residents

Branches:

Regional Extension Services, Central Region
Field and Special Crops

Funding:

80/81 - $ 400
81/82 - $ 400
82/83 - $1,500
83/84 - $1,500

Objective:

To establish and publish horticulture recommendations for the Stikine Valley.

Summary:

It has been demonstrated that vegetables such as potatoes, rutabagas, beans, parsnips, cabbage and early sweet corn grow well in the Stikine Valley.

In September 1983, potato yields of total edible tubers were as follows:

Kennebec	16 lbs./hill	(7.3 kg/hill)
Norland	11 lbs./hill	(5.0 kg/hill)
Russet Burbank	6 lbs./hill	(2.7 kg/hill)

Potato varieties grown in the valley before Demonstration Trials were: Dutch yellow, purple and finger potatoes. These yielded as follows in September 1983:

Dutch Yellow	3.3 lbs./hill	(1.5 kg/hill)
Purple	2.7 lbs./hill	(1.2 kg/hill)
Finger	2.9 lbs./hill	(1.3 kg/hill)

Fruit Trees: Apples yielding well in 1983 were: Heyer 12, Adam, Dawn, Sylvia, Boughen Delight and Rescue crab.
Other species under evaluation include: pears, plums, strawberries, raspberries and currents.

Flower Seeds: Flower seed trials were established in 1983. Seed was harvested from the annual flowers. The seed viability and yields of clean seed will be calculated.

Forage and Cereal: The moist summer produced good yields of adapted forage crops including: alfalfa, alsike and red clover, birdsfoot trefoil, orchardgrass, bromegrass, timothy, slender wheatgrass and reed canary grass. Good vegetative crops of wheat, barley and oats were grown, however, only oats and barley yield mature cereal seed.

Preliminary horticulture recommendations for the Stikine Valley are pending.

PROJECT: No. 93

DEMONSTRATION OF EQUIPMENT FOR DEVELOPING ORGANIC WETLANDS

Control structure uses corrugated steel piling and is rip-rapped for erosion control.

Project Supervisors:

- Roly Kilpatrick, Agricultural Engineer, B.C. Ministry of Agriculture and Food, Abbotsford
- Peter Fofonoff, District Agriculturist, B.C. Ministry of Agriculture and Food, Williams Lake

Co-operators:

- Eric Reay, farmer
- Martin Driehuyzen, Soils and Water Management Specialist, B.C. Ministry of Agriculture and Food, Cloverdale
- John Metzger, Senior Agricultural Engineer, B.C. Ministry of Agriculture and Food, Abbotsford

Branches:

Engineering
Regional Extension Services, Thompson-Cariboo Region

Funding:

81/82 - $9,800
82/83 - 4,800
83/84 - 5,500

Objectives:

To develop and demonstrate the special equipment and methods required to optimize forage production on organic wetlands in the interior. All major activities including land clearing, water level control, cultivation and seeding and harvesting are being filmed for use at short courses, workshops and seminars.

Summary:

Since the early development of the ranching industry in the Interior, organic wetlands provided grazing and a major source of winter feed but forage yields on organic wetlands are low. Water control measures can improve forage production on wetlands. These measures allow for draining in wet years and sub-irrigation and/or flooding in dry ones.

The application of fertilizer has shown that forage production on some native wetlands can be markedly increased. Fertilization and seeding to domestic forage crops such as reed canarygrass has increased forage yields substantially.

Development of wetland meadows has been hindered by a lack of commercially available equipment capable of working on unstable meadow soil.

Eric Reay's meadow is being used as a development and equipment demonstration site. Development to date has included topographical surveys, ditch improvement, water control structure construction and evaluation, and land clearing. Tillage equipment trials were taking place in the fall of 1983.

PROJECT: No. 94

FORAGE IMPROVEMENT PROGRAM FOR VANCOUVER ISLAND

Grass seed is harvested in the Comox Valley for species evaluation trials.

Project Supervisor:

- Peter Jones, District Agriculturist, B.C. Ministry of Agriculture and Food, Courtenay

Co-operators:

- Vancouver Island Sheep Breeders Association
- Field Island Angus Club

Branches:

Regional Extension Services, South Coastal Region
Field Crops Branch

Funding:

82/83 - $800

Objectives:

1. Evaluate new forage species for Vancouver Island
2. Compare pasture improvement methods using existing forage species

Summary:

1. The variation in TDN, protein and mineral content between species throughout the grazing season continues to be monitored. However, as the stand gets older, it becomes more difficult to take samples of the pure species because of the invasion of non-sown species. The ability of the sown species to compete and remain productive is of prime importance to producers and this will be one of the most important aspects of this trial.

2. The variations in fertilizer applications, cutting and spraying techniques continued during 1983 on the Rush Control Trial. Differences in herbage yield, quality and botanical composition are being monitored. A combination of regular cutting after grazing plus high fertility has eliminated the rushes in a relatively short time. It remains to be seen, if this situation can be maintained.

3. The seed multiplication plots at the Agriculture Canada Research Station at Sidney, have produced seed that is now being tested at Beaverlodge, Alberta, Kamloops, Prince George and in the Fraser Valley.

PROJECT: No. 97

OVERWINTERING OF HONEYBEE QUEENS FOR COMMERCIAL USE AND PRODUCTION OF PACKAGE BEES

An apiculture specialist demonstrates some of the equipment used to package and weigh bees.

Project Supervisor:

- D.M. McCutcheon, Supervisor of Apiculture Programs, B.C. Ministry of Agriculture and Food, Cloverdale

Co-operators:

- B.C. Honeybee Stock Improvement Project
- Simon Fraser University

Branch:

Apiculture

Funding:

82/83 - $4,124
83/84 - $3,300
84/85 - $3,100

Objectives:

To develop practical methods of overwintering large numbers of honeybee queens and to demonstrate such methods in supplying commercial queen honeybee requirements in April and May; to develop expertise in all aspects of package bee production, to develop cost studies and to monitor hives from which package bees are produced for use in polllination and honey production.

Summary:

A successful method of overwintering queen bees in B.C. would create an economic opportunity for beekeepers and lessen dependence on U.S. producers.

Of the methods evaluated for overwintering queens, one has been selected for additional testing. Queens are placed on 3 cm x 3 cm sections of honey comb, surrounded by wooden sides and covered by queen excluder material. The success rate and time efficiency of this method was such that testing on a larger scale during the 1983/84 winter season is taking place.

In the package bee production portion of the project, several evaluations are being conducted:

- methods of preventing the queen from being removed from the combs with the bees being shaken for packages

- methods of transferring bees from hives to package bee cages

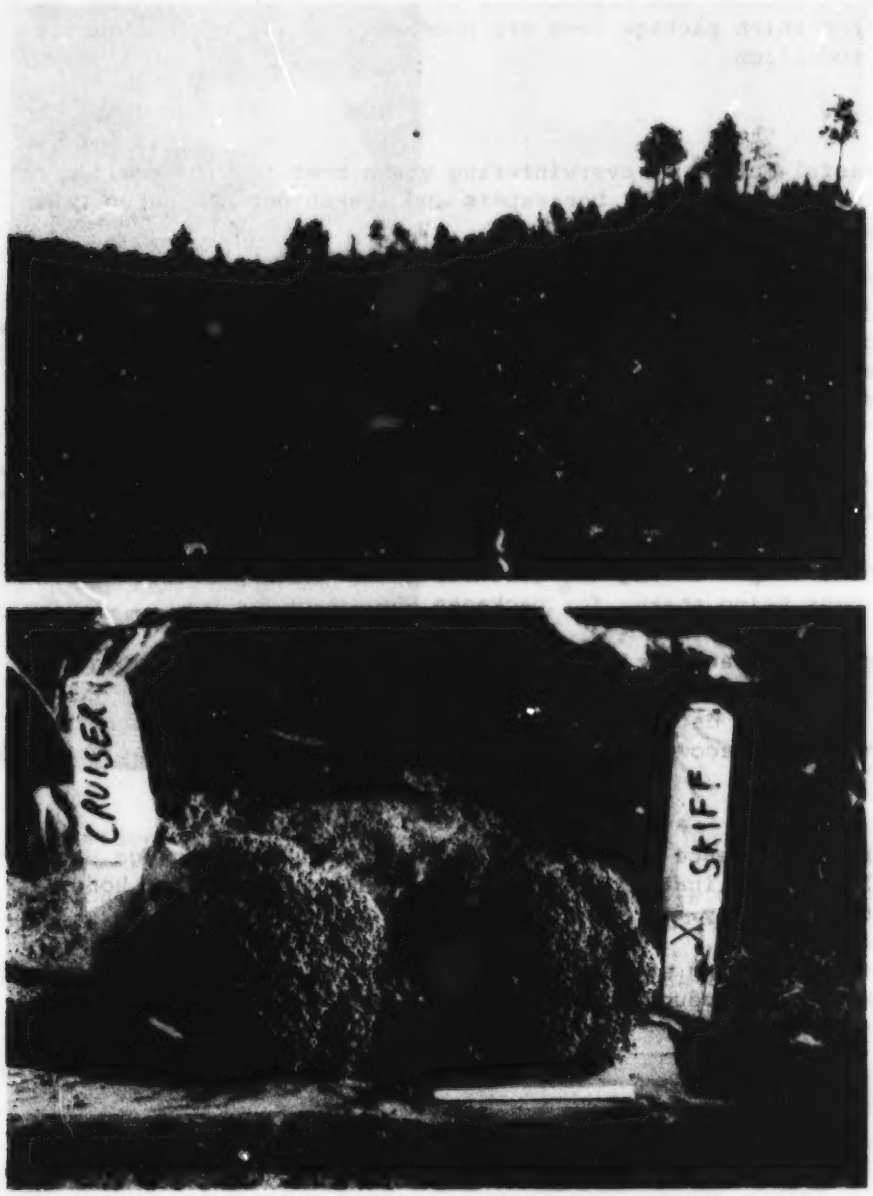
- the effect of dates and volume of bees shaken in April on the ability of hives to recover for crop pollination in May and June and for honey production

Preliminary evidence indicates that hives producing package bees are not suitable for pollination work in May but are suitable for honey production in July.

Preliminary costing studies have been carried out and extension material on Package Bee Production has been prepared.

PROJECT: No. 98

EVALUATION OF VEGETABLE CROPS IN THE CENTRAL REGION OF BRITISH COLUMBIA



Vegetables are being evaluated for growing in north central British Columbia.

Project Supervisor:

- G.S. Emmond, Regional Horticulturist, B.C. Ministry of Agriculture and Food, Prince George

Co-operators:

- Robin Hawes and Hildo Hoek, vegetable growers at Smithers
- Tony Greengrass, vegetable grower at Prince George

Branch:

Regional Extension Services, Central Region

Funding:

81/82 - $ 550
82/83 - $2,650
83/84 - $2,250

Co-operators contributed land and irrigation water

Objectives:

1. To evaluate the quality and yield of broccoli, cabbage and cauliflower varieties for field production, and

2. To evaluate several plant densities of the above crops for optimum yield and quality of product.

Summary:

The aim of this project is to find suitable varieties of vegetables for production in the north central area of B.C.

Vegetable evaluations showed that Premium Crop broccoli followed closely by Emperior, Skiff, Green Valiant, Green Charger and Shogun produced excellent quality heads. The latter three varieties tended to have a green-purple head color which could be more pronounced in some years and present some consumer acceptance problems.

White Rock, White Top, White Summer, Elgon and Dominant were very impressive cauliflower varieties.

Princess and Stonehead cabbage were the best midseason cabbage in the Central Region. Storage Green, Houston Evergreen, Safe Keepe and Quick Storage Green produced 4 1/4 to 5 1/2 pound heads while Winter Keeper produced large 8 pound heads. After holding in cold storage for 70 days Winter Keeper required the least amount of leaf stripping to reach a store marketable head. After 130 days Storage Green had considerably less bacterial leaf damage and the best internal green color of all the above cabbage held in storage.

Plant population studies show that a vegetable grower could use certain plant densities to produce and supply to market high quality broccoli, cauliflower and cabbage of specific size provided optimum fertilizer and moisture conditions are available. Reducing the soil area occupied by each Preimum Crop broccoli plant from 4.5 sq. ft. down to 1.8 sq. ft. decreased the average head weight by 28%. Expressed as yields the average marketable yield increased from 2.4 tons per acre to 4.3 tons per acre. This represented a yield increase of 79% because of the higher plant population. The close density plantings had smaller size but longer stem heads that still retained tight compact florets.

Stonehead cabbage showed similar reductions in head weight and increase in yields when plant populations were increased provided growing conditions were optimum. Reducing the area occupied by each cabbage plant from 4.5 sq. ft. to 2.3 sq. ft. resulted in a 8% decrease in average head weight. Expressed as yields the average marketable yield increased by 80% from approximately 16 tons to 29 tons per acre.

Cauliflower quality was adversely affected by too close planting. Plant vigor declined, curd protection decreased and the curd was not dense nor compact but tended to be loose and ricy. Reducing the soil area occupied by each Dominant cauliflower plant from 4.5 sq. ft. to 3 sq. ft. decreased the curd weight by 10%. Expressed as yields the marketable yields of Canada No. 1 and 2 cauliflower increased by 25% from approximately 4 tons to 5 tons per acre. Reducing the plant growing area from 3 sq. ft. to 2.3 sq. ft. resulted in a 25% reduction in curd weight and a sharp drop in curd quality.

PROJECT: No. 99

THE APPLICATION OF INTEGRATED PEST MANAGEMENT TO LETTUCE PRODUCTION IN B.C.

Project Supervisors:

- H.S. Gerber, Entomologist, B.C. Ministry of Agriculture and Food, Cloverdale
- William Dun, summer student

Co-operators:

- John R. MacKenzie, Research Technician (Agricultural Pest Management), Agriculture Canada
- Robert S. Vernon, Research Scientist, Agriculture Canada
- George Rush, Manager, Cloverdale Lettuce and Vegetable Co-operative
- Ted Warhurst, Gerry Spranger, lettuce growers
- Brian Johnston, Agricultural Consultant

Branch:

Crop Protection

Funding:

81/82 - $9,900
82/83 - $ 400

Objective:

To evaluate through trial implementation, an integrated pest management program (IPM) for the major insect pests of lettuce in B.C., particularly the lettuce aphid, Nasonovia ribisnigri.

Summary:

In 1981 a new pest, the lettuce aphid was not adequately controlled by preventive sprays. In some fields, up to 100 per cent loss occurred and in 1982 approximately one half of the crop worth an estimated $1 million could not be marketed because of the presence of lettuce aphid. To address this problem, an IPM program based on regular insect surveys was evaluated in lettuce fields in the Clover Valley. The program was successful in determining when and where insecticide sprays should be applied. The effectiveness of currently registered insecticides for control of the major insect pests of lettuce including the lettuce aphid was assessed.

Techniques for sampling lettuce plantings for aphid and caterpillar pests and the accompanying criteria for spray decisions were demonstrated and issued to growers in written form. The most appropriate insecticides to use against specific insect problems were also conferred to growers through farm visits and through discussions at meetings with members of

the Cloverdale Lettuce and Vegetable Co-operative.

This year, regular monitoring of lettuce fields in the Cloverdale area for lettuce aphid was conducted and growers were alerted when to spray. As a result, no lettuce was rejected because of lettuce aphid.

PROJECT: No. 100

EVALUATION OF HIGH-TENSILE HIGH-VOLTAGE ELECTRIC FENCES TO PROTECT FRUIT TREES AND HAYSTACKS FROM DEER AND ELK DAMAGE

High-tensile electric fencing is being evaluated for its effectiveness in protecting orchards and haystacks from deer and elk damage.

Project Supervisor:

- H.A. Kluge, Vertebrate Specialist, B.C. Ministry of Agriculture and Food, Summerland

Co-operators:

- G.G. Anderson, Senior Pest Control Officer, Kelowna
- C.G. Carter, Pest Control Officer, Vernon
- K.B. van Dalfsen, Agricultural Engineer, Vernon
- H.G. Geldart, Regional Farm Economist, Summerland
- D.L. Weatherill, orchard manager, Coldstream
- V. Kuntz, rancher, Wycliffe

Branch:

Crop Protection

Funding:

81/82 - $ 200
82/83 - $3,000
83/84 - $1,400

Objectives:

1. To evaluate the "Penn State" 5-wire vertical electric deer fence design, or modification thereof, to exclude deer from orchards and elk from hay stackyards.

2. To evaluate a 7-wire slanted electric deer fence design to exclude deer from orchard.

3. To compare the costs of construction, operation and maintenance of electric wildlife fences to those of conventional page-wire fences.

Summary:

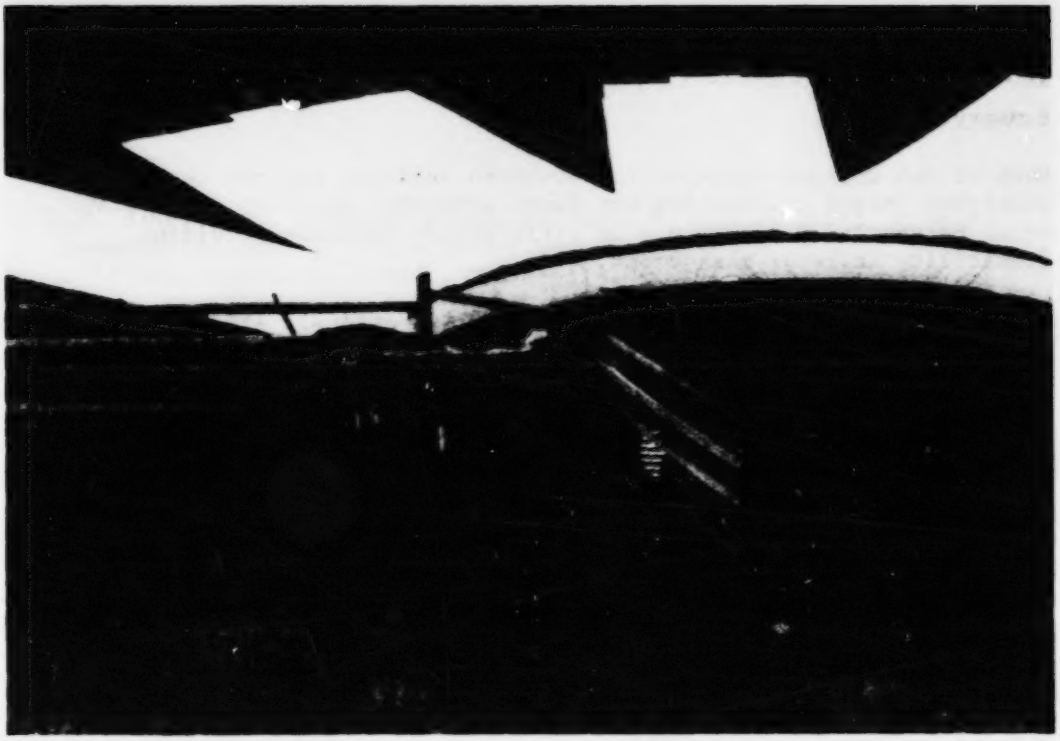
A 12 hectare apple orchard in Coldstream, near Vernon, was chosen as the site for the experimental deer fence. New plantings and interplantings of several varieties of apples had sustained severe browsing damage by white-tailed deer in previous years. In June 1982, a 350 m 5-wire vertical electric fence was constructed around a 0.7 ha block of young apple trees. The major structural components were pressure-treated posts and high-tensile 12 1/2 ga. galvanized wire. Special brace assemblies were constructed at the gate and at the corners of the enclosure. Line posts were set up to 19.5 m apart. The major electrical component was a 12 V DC high-voltage, low-impendance energizer. Different designs of minor components and hardware were incorporated into the fence for demonstration and evaluation. Initially, the fence was built according to the "Penn Sate" design. However, in fall 1982, it became apparent that mule deer were able to enter the orchard block by jumping over the fence. In order to exclude both species of deer, the height of the fence was increased to 2.1 m by adding to more wires 30 cm apart. There was little or no evidence of deer damage to the fruit trees in winter 1982/83. In August 1983, a private contractor erected 7-wire high-tensile electric fence around the entire property, including an adjacent 12 hectare pasture. The experimental fence was subsequently removed at the owner's request in September.

A 485 ha beef cattle ranch in Wycliffe, near Cranbrook, was chosen as the site for the experimental elk fence. The 1.1 ha hay stackyard, surrounded by a 1.3 m high barb-wire stock fence, had been invaded by Rocky Mountain elk in previous winter seasons. In October 1982, a 463 m 7-wire vertical electric fence was erected around the stackyard. There was no evidence of elk damage to the haystacks in winter 1982/83. However, it was realized that an 8-wire, 2.4 m high configuration would result in a simpler design and ensure that the experimental elk fence would also be deer-proof. In September 1983, the bottom wire was lowered to 30 cm, the next five were re-installed 30 cm apart and an additional wire was installed 30 cm from the top.

Construction of a 7-wire slanted electric deer fence is planned for fall 1983. This experimental fence will be located in the Okanagan Valley, however the final decision on a suitable orchard site has not been made at this time.

PROJECT: No. 101

WATER HARVESTER FOR DRYLAND RANGE



The water harvester provides water for cattle in the dryland range of the Southern Interior.

Project Supervisors:

- L.G. Brown, Engineering Technician and A.H. Bawtree, Range Specialist, B.C. Ministry of Agriculture and Food, Kamloops

Co-operators:

- J.M. Christian, Cache Creek area rancher

Branches:

Engineering
Field and Special Crops

Funding:

81/82 - $3,500
82/83 $ 575

Objectives:

1. To demonstrate a Water Harvester to provide water for cattle on dryland range.

2. To establish the economic benefits of the water harvester versus traditional water delivery system on dryland range.

Summary:

Much of the dryland range of the Southern Interior has the capacity for increased forage utilization but lacks livestock watering capability. Water harvesters can supply this water in any location providing flexibility in range management.

The first use by cattle was from March 30 to April 25, 1983 on a range site near Cache Creek. Cattle had free choice of water from either the harvester or from water pumped to standard troughs. No difficulties were observed in cattle using the harvester. However, they showed reluctance to use the harvester once it was down 61 cm and preferred the constantly filled troughs.

Because of this, future design recommendations will be for deeper tanks with smaller diameters and with remote float-controlled troughs for cattle use. This modification will reduce the surface area for reduced evaporation and allow greater flexibility in materials selection.

Results for one full year are:
(August 13, 1982 to August 12, 1983)

Total Precipitation:	271.8 mm
Total Possible Harvest:	40,400 L
Total Harvest:	31,200 L
Efficiency:	77.2%

PROJECT: No. 102

CHEMICAL CONTROL OF ONION WHITE ROT

Project Supervisor:

- D.J. Ormrod, Plant Pathologist, B.C. Ministry of Agriculture and Food, Cloverdale

Co-operators:

- J.E. Rahe, Plant Pathologist, E. Littley, D. Goertz and B. Vimard, Research Assistants, Simon Fraser University
- A. Stetar, vegetable grower, Cloverdale, and H. Lodder, vegetable grower, Grand Forks

Branch:

Crop Protection

Funding:

81/82 - $6,000
82/83 - $3,000

Objectives:

To conduct field trials to demonstrate the efficacy of dicarboximide fungicides (Ronilan, Rovral, BCI-100F) for control of onion white rot at various rates and modes of application.

Summary:

Onion white rot is a widespread and increasing disease problem for B.C. vegetable growers. The two-year trial period demonstrated that seed treatment with Ronilan provides substantial reductions in the incidence of white rot and increases in yield of marketable onions over untreated controls. Efficacy of seed treatment varied with location. On mineral soil at Grand Forks, seed treatment with Ronilan provided 100 per cent control of white rot on silverskin onions. On muck soil at Cloverdale, disease on bulb onions was reduced by 40 to 50 per cent over that occurring in untreated controls in both 1982 and 1983. Mid-season foliar applications of Ronilan also reduced white rot, but were less effective than were seed treatments.

These trials showed that white rot can be reduced by both seed and foliar treatments with Ronilan. BCI-100F was comparable to Ronilan in efficacy; Rovral was less effective. The results suggest that seed treatment is reliably cost effective and that registration of Ronilan for this mode of application should be sought. It is not clear that foliar applications would be cost effective, and further evaluations of the effect of time and number of foliar applications is required.

PROJECT: No. 103

FARMER USE OF VIDEO TAPE AGRICULTURAL PROGRAMS

Ministry audio-visual specialists prepared video-tape programs for staff use at farmer extension meetings.

Project Supervisor:

- R. Sera, Director, Information Services Branch, Victoria

Co-operators:

- Dave Kent, Co-ordinator, Media Production Centre, Kelowna
- Bob Kohlert, Regional Director, Prince George
- Al Isfeld, Regional Director, Kamloops

Branch:

Information Services Branch

Funding:

81/83 - $4,200
82/83 - $6,000
83/84 - $6,500

Objective:

Encourage farmers and ministry staff to use modern electronic communications techniques in agricultural extension, and to demonstrate the ease and benefits of using video tape programs as educational tools.

Summary:

Two half-inch video-tape playback units and 20" TV monitors were purchased and installed at the Prince George and Kamloops field offices in May, 1982. Twenty-four video programs and several slide-tape programs were either reproduced or purchased and made available at an on-site library. The programs were of general interest although predominantly oriented to livestock production and husbandry. The service was promoted to farmers via ministry newsletters.

Although an estimated 1,150 viewers have used the programs since April '82, response was best when the machines were available at staff-run events (field days, seminars, etc.). Few farmers viewed programs at ministry offices.

The success of the service will depend upon: a) the continued expansion of the video library; b) availability of more playback units. As more farmers are purchasing their own video machines, programs for loan-out will become more popular; the self-serve concept appears to be marginal at best. Special audio-visual programs were purchased from other provinces or states while more B.C. programs were produced by ministry staff in an effort to expand the library. This will continue. Ministry staff are now much more aware of the potential of electronic communications in extension work and are demanding more programs as a result of this project. The future is promising for innovation in agricultural extension/communications techniques.

PROJECT: No. 105

HARVEST AID FOR LETTUCE, CAULIFLOWER, CABBAGE AND BROCCOLI

Field trials of a harvest aid with conveyors show that the operation can be done more quickly than by hand-harvesting with a crew of the same size.

Project Supervisor:

- Roly Kilpatrick, Agricultural Engineer, B.C. Ministry of Agriculture and Food, Abbotsford

Co-operators:

- Yin Soo, and Howe Wong, vegetable growers
- George Rush, Cloverdale Lettuce and Vegetable Co-op
- Jim Conroy, Regional Vegetable Crop Specialist, B.C. Ministry of Agriculture and Food, Cloverdale

Branch:

Engineering

Funding:

82/83 - $7,150
83/84 - 2,200

Objectives:

To design, fabricate and field test a conveyor belt system to assist and improve present methods of hand harvesting lettuce, cauliflower, cabbage and broccoli. The harvest aid will facilitate picking, grading, boxing and palleting operations.

Summary:

All of the lettuce, cauliflower and cabbage harvested in British Columbia is picked, trimmed and packaged by hand. Usually it is loaded onto trucks or trailers by hand. The cost of vegetable production could be reduced by minimizing the amount of hand labor required.

A harvest aid with conveyors was made and field trials indicate that the speed of harvest is greatly increased when using this machine, compared to harvesting completely by hand with a crew of the same size. Trials are continuing, to determine the optimum method of handling the produce on the wagon.

PROJECT: No. 106

SOIL EROSION CONTROL WITH INTERCEPTOR DRAINS

Project Supervisor:

- M.G. Driehuyzen, Provincial Drainage Specialist, B.C. Ministry of Agriculture and Food, Surrey

Co-operator:

- Nahar Mahal, farmer, Aldergrove,

Branch:

Soils

Funding:

82/83 - $3,170
83/84 - $500
Co-operator's contribution - machinery

Objectives:

To evaluate the effectiveness of an interceptor drainage system in controlling runoff water and reducing soil erosion on steeply sloping land in row crops.

Summary:

Forty-two per cent (25 000 ha) of the soils in Matsqui and Langley municipalities are subject to damaging erosion during winter months when they are clean-cultivated, or in row crops such as strawberries, raspberries, or cole crops. Conventional erosion control methods, such as contour farming, strip cropping and the use of winter cover crops are not readily accepted by growers because these methods interfere with preferred cultural practices used for growing these crops. One method to reduce soil erosion is the use of interceptor drains to control runoff water before it causes erosion.

A research and demonstration plot has been established on a co-operating farm in the Mt. Lehman area. The plot covers 0.27 ha on a 9% slope, 150 m long. One-half is tile drained at 15 m spacing and the other half is undrained. Apparatus for measuring runoff and eroded soil is placed at the downhill end of the plots.

Runoff and Soil Erosion Measured, October 1982 - April 1983

PLOT	NO. OF RUNOFF EVENTS	AVERAGE % RUNOFF	SOIL LOSS (tonnes/ha)
Without Drains	24	26%	28.7
With Drains	11	6%	0.4

These measurements show that drainage is effective in reducing soil erosion. In the 1983/84 winter season, a recording rain gauge has been installed on the project site. Rainfall, runoff and erosion data can be used to predict erosion losses on similar soils in the South Coastal region.

PROJECT: No. 108

DEMONSTRATION OF NEW APPLE VARIETIES FOR COASTAL CONDITIONS

This planting of new varieties of apples is located at Courtenay.

Project Supervisor:

- G.B. Warner, Horticulturist, B.C. Ministry of Agriculture and Food, Sidney

Co-operators:

- Plant Quarantine and Research Station, Agriculture Canada, Sidney
- Bob Cropper, orchardist, Courtenay
- John DeWhalley, farmer, Sointula, Malcolm Island

Branch:

Regional Extension Services, South Coastal Region

Funding:

82/83: $600
83/84: $250

Objectives:

To evaluate through field trials the suitability of new varieties of apples for growing under coastal conditions. Newer varieties with disease resistance are to be observed under local conditions to see how they compare with current commercial varieties for both disease resistance and commercial acceptance.

Summary:

The major disease problems facing apple growers under coastal conditions are European Canker (Nectria galligena) and apple scab (Venturia inaequalis). Currently, there are several new varieties of apples on the market which have been developed with resistance to one or more of the major apple diseases. If these varieties perform well under trial conditions, savings in spraying costs and labor could be realized by growers

To observe these varieties, three plantings were established in the spring of 1983. These plantings were situated at Sidney, Courtenay and on Malcolm Island. All three plantings contain approximately 25 varieties with two trees of each variety. The plantings will be increased as new varieties become available.

All plantings were established and only one tree was lost. It is hoped that some fruit will be available for observation in 1984, and by 1985 all varieties should be producing. At that time, growers' field days will be held and information published regarding the performance of these trees.

PROJECT: No. 109

DEMONSTRATION OF FREE-STALL MATS

Project Supervisor:

- P.D.A. Johnson, Agricultural Engineer, B.C. Ministry of Agriculture and Food, Abbotsford

Co-operators:

- Harry J. Bos, CMZ Enterprises Inc., Fort Atkinson, Wisconsin
- North West Rubber Mats Ltd., Pitt Meadows
- Andy Driesen, dairy farmer, Abbotsford

Branch:

Engineering

Funding:

83/84 - $3,000

Objectives:

To evaluate the effectiveness and demonstrate the use of various types of mats for free-stalls in dairy buildings.

Summary:

Due to the critical shortage of wood shavings and sawdust for bedding it is imperative that dairymen conserve or eliminate bedding for free-stalls. If a good mat can be installed on a concrete-based free-stall, the bedding requirement can be reduced by 80 per cent. The significance of this development is such that every dairyman in the province can take advantage of this new technology. The total animal cost, per stall, to maintain bedding in a typical free-stall is about $100. A one-time expenditure of about $100 per stall could eliminate this annual cost.

Research has been carried out on the different types of free-stall mats available in North America but no evaluation reports are available.

Several mats have been purchased for installation on a co-operating farm. The cow's comfort, preference of mats and health will be observed for a period of six months. Information gained will be released to dairymen in the form of an Engineering Note, free-stall plan, and field day on the co-operating farm.

PROJECT: No. 112

DEMONSTRATION OF BEEF PRODUCTION ON IRRIGATED PASTURE AND THE USE OF HIGH TENSILE SMOOTH WIRE FENCING

The angle brace assembly for a high-tension, smooth-wire fence is checked.

Project Supervisor:

- F.L. Moore, Assistant District Agriculturist, L.G. Brown, Engineering Technician, B.C. Ministry of Agriculture and Food, Kamloops

Co-operators:

- A. Caldow, Farm Manager, Tranquille Farm, Kamloops

Branches:

Regional Extension Service
Engineering

Funding:

82/83 - $2,330
83/84 - $1,520
84/85 - $ 150

Objectives:

1. To demonstrate productivity of irrigated pastures in comparison to range for beef production.

2. To demonstrate alternative management techniques to improve beef production using a combination of range and irrigated pasture.

3. To investigate the potential of supplemental grain feeding to finish cattle directly off pasture.

4. To determine the effectiveness of smooth wire, high tensile fencing under conditions of high cattle pressure and to develop suitable materials and methods to build more economical cattle fences.

Summary:

The primary objective of the second year of this project was to determine the potential for finishing cattle directly off pasture by feeding supplemental grains for a limited period. Two groups of 10 steers each were grazed on irrigated pasture for approximately 4.5 months, with one group being fed grain for 40 days prior to being slaughtered. A total of 1,000 kg of rolled barley was consumed by this group of 10 steers. Feeding of supplemental grain increased average daily gain to 3.2 pounds per day from 1.93 pounds per day for steers on pasture only. Steers were slaughtered at an average weight of 1,127 pounds after 40 days of receiving grain. All steers graded A1.

The group of 10 steers on pasture only were sold three weeks later live at an average weight of 1,015 pounds. Difference in the net price received for the two groups of animals was not significant and was primarily due to the different methods of selling (i.e. live versus rail grade). Feeding supplemental grain to steers on pasture appears to produce economical beef gain and increases producers marketing options.

The high-tensile smooth-wire fence has continued to perform satisfactorily. Two methods of inside corner bracing on moderate changes of fence line direction were successfully demonstrated.

Dropper design; attachment to smooth wire has been previously shown to be a problem. Several dropper designs were tested and all types are performing the functions required of a dropper but all have limitations or disadvantages. Additional testing will be carried out to include various wiring and stapling methods. Recommendations will be made for dropper design after a second season of use.

PROJECT: No. 113

ESTABLISHMENT AND MANAGEMENT OF A RANGELAND SEEDING

Project Supervisor:

- R.M. Tegart, Field Crops and Range Specialist, B.C. Ministry of Agriculture and Food, Creston

Co-operators:

- W.O. Green, Skookum Ranches, Skookumchuck
- M.J. Malmberg, District Agriculturist, B.C. Ministry of Agriculture and Food, Cranbrook
- L.G. Brown, Engineering Technician, B.C. Ministry of Agriculture and Food, Kamloops
- N.A. Gough, Soil Fertility Specialist, B.C. Ministry of Agriculture and Food, Kelowna

Branch:

Regional Extension Services, Okanagan-Kootenay Region

Funding:

82/83 - $1,018
83/84 - $6,260

Objectives:

The project has three objectives:

1. To demonstrate tillage and seeding requirements necessary to ensure successful seeding by use of the ministry's rangeland seeding equipment.

2. To demonstrate the management of a Crested Wheatgrass/Alfalfa seeding by measuring animal performance and seeding productivity and assessing it through an economic evaluation.

3. To provide additional information on species/and variety selection, fertility needs and the economics of fertilization.

Summary:

If the cattle industry is to remain competitive and expand in the East Kootenays, the establishment and efficient management of seeded pastures is a necessity. Therefore, good local information and hands-on experience is necessary to encourage the adoption of rangeland seeding as a viable range improvement practice.

PROJECT: No. 114

EVALUATION OF FORAGE VARIETIES IN THE PEACE RIVER

Monitoring of forage species for establishment, productivity, grazability and regrowth in the Peace River has continued.

Project Supervisor:

- J.R. Green, Community Pasture Specialist, B.C. Ministry of Agriculture and Food, Dawson Creek

Co-operators:

- Keith Carrol, Plant Science Instructor, Northern Lights College
- Prespatou Livestock Association
- Farrell Creek Livestock Association
- Sunset Prairie Livestock Association
- Cecil Lake Livestock Association

Branch:

Regional Extension Services, Peace River Region

Funding:

82/83 - $4,700
83/84 - $2,100

Objectives:

To demonstrate the productivity, longevity and grazability of approximately 50 forage varieties, both individually and in mixes, through establishment and monitoring of large-scale forage nurseries at four community pasture locations in the Peace River area.

Summary:

Poor forage productivity is a major problem in areas which are cleared, broken and seeded to permanent pasture. Substantial increases in production are possible if suitable pasture species are used and proper seeding practices and management are employed.

Forage nurseries were established at four community pastures during 1980-82. Over 50 varieties of grasses and legumes were seeded in 10 x 200 ft. strips, using a Brillion Seeder. In addition, 15 to 20 mixes were seeded in 20 x 200 ft. strips.

Monitoring of species/mixes for establishment, productivity, grazability and regrowth have continued in 1983.

Two nurseries were hayed and the others were grazed to observe fall regrowth potential. Signs were constructed, then painted, for all individual forage species within each nursery.

Fencing materials have been purchased for cross-fencing this fall, in order to control grazing on only a portion of all species/mixes within each nursery. A tour of the Farrell Creek Nursery was conducted in July.

Observations made at the forage nursery sites over the past three years resulted in several changes to previous pasture recommendations for the Peace River, as well as fine-tuning of mixes in certain areas. One particular mix, consisting of Birdsfoot Trefoil and Meadow Foxtail has proved very productive at all sites.

The forage nurseries are open to viewing throughout the growing season.

PROJECT: No. 115

DEMONSTRATION OF THE PRODUCTION, ECONOMICS, AND MARKETING OF THE OYSTER MUSHROOM

Oyster mushrooms growing in pulp mill sludge.

Project Supervisor:

- J.T. Hill, Horticulturist, B.C. Ministry of Agriculture and Food, Cloverdale

Co-operators:

- Marketing Branch, B.C. Ministry of Agriculture and Food
- Economics Branch, B.C. Ministry of Agriculture and Food
- MacMillan Bloedell Research
- B.C. Research
- Sun Rype Products

Branch:

Regional Extension Services, South Coastal Region

Funding:

83/84 - $7,400
84/85 - $4,000

Objective:

To develop suitable growing media and cultural methods for the production of oyster mushrooms, and determine production costs.

Summary:

The oyster mushroom, which differs from other mushrooms produced commercially in British Columbia, is an exotic mushroom used in gourmet cooking and usually imported. Producers have expressed considerable interest in growing this mushroom. Oyster mushrooms have been grown on waste products in many parts of the world for years but in 1982, work at B.C. Research demonstrated that these mushrooms could be grown on a small scale in pulp mill sludge and mixtures of other waste materials. Since the growing medium is not composted, a method is required to destroy undesireable micro-organisms prior to spawning. On a small scale autoclaving has proved a useful treatment but is uneconomical on a commercial basis. Consequently, a bin for bulk pasteurization of media has been designed and is near completion. Two growing rooms were constructed and have been used for limited production on autoclaved media.

Media composed of 65 per cent pulp mill sludge, 30 per cent apple pomace and 5 per cent soya flour or pea flour or wheatbran gave acceptable mushroom yields in 21 days from spawning.

When the techniques for growing cyster mushrooms can be applied to commercial operation and the costs of production are determined an investigation into their marketability will be conducted.

PROJECT: No. 116

DEMONSTRATION OF THE FEASIBILITY OF AN ONGOING PROGRAM TO IDENTIFY GRAPE VINE PLANTINGS IN THE OKANAGAN SUITABLE FOR VIRUS-TESTED PROPAGATION

Nematode samples taken in the vineyards will be identified and studied.

Project Supervisor:

- John Vielvoye, Provincial Grape Specialist, B.C. Ministry of Agriculture and Food, Kelowna

- Dave J. Ormrod, Plant Pathologist, B.C. Ministry of Agriculture and Food, Cloverdale

Co-operators:

- R. Stace-Smith, Research Scientist, Agriculture Canada, Vancouver
- T. Vrein, Research Scientist, Agriculture Canada, Vancouver
- J. Shier, Research Technician, Agriculture Canada, Vancouver
- C. Holbrook, Plant Clinic Supervisor, B.C. Ministry of Agriculture and Food, Cloverdale
- J. Bates, Summer Student, B.C. Ministry of Agriculture and Food

Branch:

Regional Extension Service, Okanagan-Kootenay Region
Crop Protection, Cloverdale

Funding:

83/84 - $7,500

Objectives:

1. To test an ELISA technique for the detection of Fanleaf, Tomato Ringspot and Arabis Mosaic in grapes.
2. Using the ELISA technique, to test specific grapevines in order to determine if they are suitable for use in establishing propagation blocks.
3. To determine levels of nematodes, particularly Xiphinema spp. in vineyards proposed to be used for propagation of virus tested grapevines.
4. To study the Xiphinema populations isolated with a view to identifying species involved and their virus transmitting abilities.
5. To transfer the technology of the ELISA technique from research programs to a service oriented laboratory.

Summary:

The market requirement for high quality wine grapes has been growing. With changes in consumer demand and the advent of cottage wineries, there has been an increased demand for new grape varieties. These new varieties cannot be propagated rapidly enough using the limited amounts of propagation material available from Agriculture Canada post-entry quarantine facility.

To address this problem, a virus detection procedure in experimental and quarantined grape plantings was initiated. This program utilized a serological technique of virus detection for three viruses detectable by this method. Nematode species reported to be capable of transmission of Tomato Ringspot virus were searched for in vineyards where virus detection was also in progress. Identification of the nematode species found, and its ability to transmit this virus, were integral parts of this program. The techniques used in these detection procedures were learned by laboratory staff so that the technology of these procedures could be implemented for future service programs.

A total of 2,551 grape tissue samples, representing 11 vineyards and 100 grape varieties, were tested for virus content. None of the varieties contained Tomato Ringspot virus; two contained grapevine Fanleaf virus and 16 contained Arabis Mosaic virus. A total of 96 soil samples were analyzed from these vineyards. Twenty-five samples contained some Xiphinema spp. nematodes. Identification of the nematode and studies involving the nematodes ability to transfer virus are not completed.

PROJECT: No. 117

AERATOR EVALUATION FOR ODOR CONTROL

Project Supervisor:

- Rick Van Kleeck, Agricultural Engineer, B.C. Ministry of Agriculture and Food

Co-operators:

- Dr. R. Bulley, Bio-Resource Engineering, University of British Columbia
- Dr. C. Guarnaschelli, CG Environmental Engineering Limited
- P. Hill Holdings Ltd., hog producer

Branch:

Engineering

Funding:

83/84 - $2,350

Objectives:

1. To demonstrate the effectiveness and evaluate the economics of Dr. Guarnaschelli's aerator as a treatment system for eliminating offensive odors from swine manure.

2. To evaluate the performance of the aerator as a solid-liquid separator.

Summary:

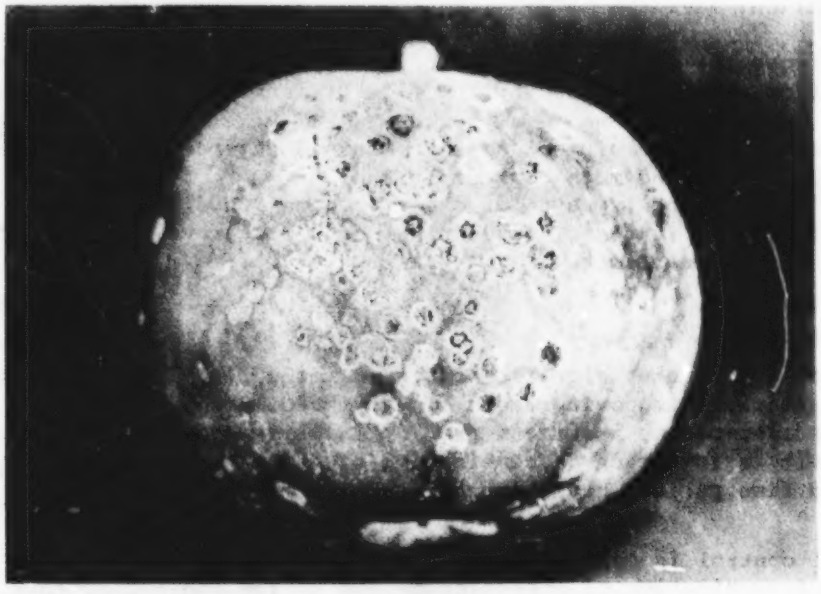
A proven method of controlling odors from swine manure has been to aerate the manure so that dissolved oxygen levels are 1 to 1 1/2 ppm or higher at all times in the manure. Few hog producers use this method for odor control due to its high capital and operation costs.

Dr. Guarnaschelli designed a low-cost aerator which was installed in a swine manure pit in January, 1983. Various motors, motor mounts, drive shafts and impellors were tried, with the results that the present aerator maintains dissolved oxygen levels about 50 per cent higher than the floating surface aerator it replaced. Dr. Guarnaschelli's aerator could be installed for about $1,500 compared to $6,500 for an equivalent 7 1/2 h.p. floating surface aerator.

The new aerator will be evaluated for its ability to separate solids.

PROJECT: No. 118

EVALUATION OF A COMPUTERIZED APPLE SCAB PREDICTOR



Apple scab is the most significant disease of apples in the higher rainfall areas of B.C. and has become a problem in other areas during the last two years.

Project Supervisor:

- R.D. Hallman, Horticulturist, B.C. Ministry of Agriculture and Food, Creston

Co-operators:

- John Yorston, Plant Pathologist, B.C. Ministry of Agriculture and Food, Summerland
- John Proctor, Entomologist, B.C. Ministry of Agriculture and Food, Summerland
- Bill McPhee, Plant Pathologist, Agriculture Canada, Summerland Research Station
- Roy Schuler, Orchardist, Creston
- B.C. Fruit Growers Association, Creston local

Branch:

Regional Extension Service, Okanagan-Kootenay

Funding:

1983/84 - $3,6000

Objectives:

1. To evaluate the new computerized "Apple Scab Predictor" for use in orchards, and to compare it to equipment for apple scab infection prediction.

2. To improve the accuracy and dependability of apple scab disease infection warnings issued by the B.C. Ministry of Agriculture and Food.

3. To evaluate this equipment as an orchard management tool for:
   a. timing codling moth control sprays
   b. timing control sprays for other insects and diseases
   c. predicting stages of development of fruit trees for the timing of cultural practices.

Summary:

Apple scab is the most significant disease of apples in the higher rainfall tree fruit growing areas of British Columbia. During 1982 and 83 it has also become a serious problem in drier areas. The conditions that result in infection (a combination of temperature and wetness for a specified time period) have been clearly identified.

Practical control is only possible with monitoring equipment that allows accurate determination of infection periods. The monitoring equipment currently in use requires interpretation and has some basic monitoring shortcomings that can result in inaccurate disease predictions.

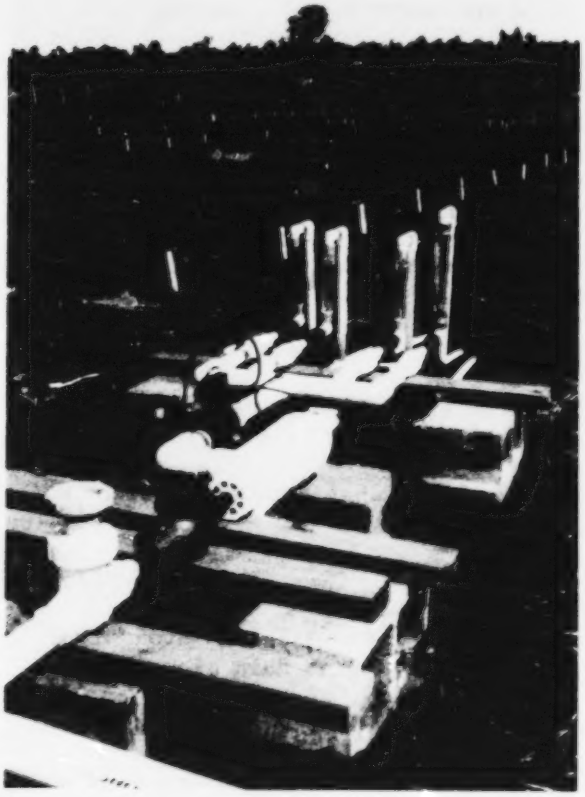
The "Apple Scab Predictor" is an in-orchard microcomputer-based electronic monitoring system which automatically records weather information and determines if an apple scab infection has occurred thus providing a more accurate prediction. This will result in fewer sprays being applied and/or better timing of those needed and thereby a financial saving to growers.

This instrument is also capable of recording degree days (a measure of heat received), a function which assists in the timing of codling moth control sprays. The system will also be evaluated for use in predicting other disease infections, the timing of control spray for other insects and the determination of the harvest date for correct maturity of apples.

The "Apples Scab Predictor" was received too late in the 1983 season for much testing to be done but will go into operation in the spring of 1984.

PROJECT: No. 119

EVALUATION OF TRICKLE IRRIGATION EQUIPMENT FOR INJECTING FERTILIZERS AND NEMATOCIDES



Header unit for a BiWall trickle irrigation system on strawberries allows for metering the fertilizer requirements to four different tests.

Project Supervisor:

- T.W. Van der Gulik, Agricultural Engineer, B.C. Ministry of Agriculture and Food, Abbotsford

Co-operators:

- John C.W. Keng, Research Scientist, Agassiz Research Station
- Bill Peters, Regional Extension Services, B.C. Ministry of Agriculture and Food, Abbotsford

Branch:

Engineering
Regional Extension Services, South Coastal Region

Funding:

1983/84 - $2,500

Objectives:

To demonstrate the benefits of applying fertilizers and possibly nematocides to raspberries and strawberries through trickle irrigation systems. Different types of emitter will also be evaluated to determine which are best suited for this type of application.

Summary:

A BiWall trickle irrigation system has been operating on strawberries since the spring 1983. A trickle system, consisting of various types of emitter plots, will be installed on raspberries early in 1984. During the next three years the raspberry and strawberry plots will be used to:

1. evaluate emitter performance under a fertigation scheme
2. development a guide for the application of fertilizer through a trickle irrigation system
3. evaluate the performance of strawberries and raspberries under different fertigation schemes
4. investigate alternate uses for trickle irrigation systems such as the application of nematocides and herbicides. (i.e. using spray emitters).

Reports and other literature will be available when data and design standards have been assigned.

PROJECT: No. 120

EVALUATION AND DEMONSTRATION OF LIVESTOCK AND POULTRY VENTILATION SYSTEMS

Project Supervisors:

- P.D.A. Johnson, Agricultural Engineer, B.C. Ministry of Agriculture Food

Co-operators:

- Peacock Equipment, Aldergrove
- Friesen Electric, Clearbrook
- Delange's Dairy Service, Sardis
- B.C. Hydro and Power Authority
- Livestock and poultry producers
- Veterinary Branch, B.C. Ministry of Agriculture and Food, Abbotsford

Branch:

Engineering

Funding:

83/84 - $2,200

Objectives:

1. To improve environmental conditions under which livestock and poultry must grow in high density housing.

2. To make producers better managers of ventilation systems.

3. To conserve energy on farms by controlling and managing ventilation systems.

4. To evaluate equipment performance and animal response under different ventilation systems.

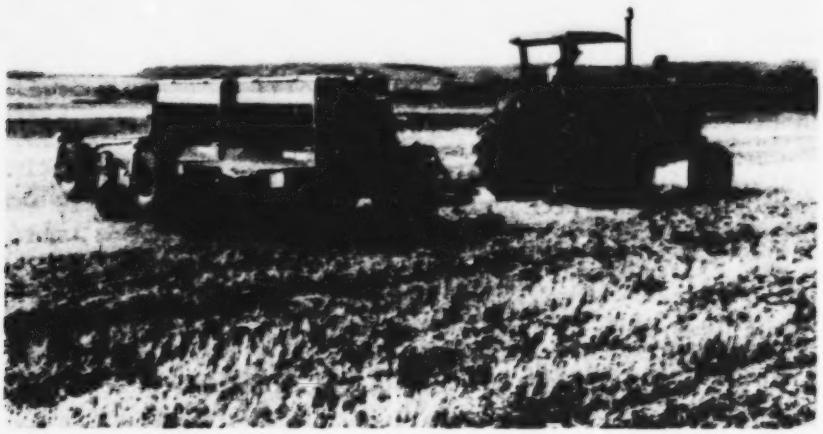
System:

The correlation between animal performance and air quality in the barns is highly significant. There is growing concern among the farming community, agri-business, and veterinarians over air quality in livestock housing. Improving air quality improves animal performance for greater returns to the producer. Improving heating and ventilation system efficiency reduces costs and conserves energy.

Ventilation systems in several broiler barns are being monitored. These will be monitored again when recommended changes are made. Similar monitoring is also being done on different types of livestock housing. The results of this project will be presented to the producers and agri-business personnel in the form of an Engineering Note and a ventilation seminar.

PROJECT: No. 121

MINIMUM TILLAGE CEREAL CROP PRODUCTION SYSTEM



The mechanical performance of a new hoe-type seed drill was being assessed for use in minimum tillage cereal crop production.

Project Supervisor:

- Tom Wilson, Agricultural Engineer, B.C. Ministry of Agriculture and Food, Dawson Creek

Co-operators:

- Frank Breault, Jim Collins, Cecil Elliott, Cyril Nobbs, Don Pederson, producers
- Jack Dobb, Gordon Hutton, Brain Harper and Allan Ford, B.C. Zero Tillage Committee

Branches:

Engineering
Field and Special Crops
Regional Extension Services, Peace River Region

Objectives:

Assess the mechanical performance of a new style "Hoe-Type Seed Drill" for use in a minimum tillage cereal crop production system.

Summary:

Zero and minimum tillage systems have the potential to significantly reduce cereal crop production costs and to increase crop yields. The disc-type seed drills commonly available on the market have serious plugging problems when used to seed directly into fields covered with heavy straw trash. Plugging is especially severe when the disc-type drills are used in combination with stiff shank anhydrous ammonial applicators.

Research indicated that a new hoe-type drill, manufactured by Versatile-Noble was capable of performing well under heavy trash conditions. A Versatile-Noble Model 2200 Hoe-type Drill was purchased, and assessed for:

- soil penetration
- seed placement
- ease of operation
- ease of adjustment
- ability to work under heavy trash cover
- power requirements
- operator safety

Ninety acres were seeded with the Versatile-Noble Drill in 1983. Five of these acres had been previously treated with anhydrous ammonia, and had a medium to heavy trash cover. A Melroe "Triple-Disc" type and seed drill, with 10-inch diameter coulter plugged badly under these field conditions. The Versatile-Noble Hoe Drill performed well and did not plug.

A side-by-side seeding comparison of the triple-disc and hoe-type drills was also performed under zero tillage conditions.

A yield comparison will be made when the demonstration plots are harvested.

PROJECT: No. 122

DEMONSTRATION OF SUBSURFACE DRAINAGE ON CRESTON FLATS

Benefits of a subsurface drainage system on Creston flats were being assessed.

Project Supervisor:

- John Metzger, Agricultural Engineer, B.C. Ministry of Agriculture and Food, Abbotsford

Co-operators:

- Peter Kemp, farmer, Creston flats
- Martin Driehuyzen, Drainage Specialist, B.C. Ministry of Agriculture and Food, Cloverdale
- Brian Laing, District Agriculturist and Greg Tegart, Field Crops Specialist, B.C. Ministry of Agriculture and Food, Creston

Branch:

Engineering

Funding:

83/84 - $1,400

Objectives:

To demonstrate and evaluate the benefits of a properly designed and installed subsurface drainage system on the Creston flats.

Summary:

Much of the Creston flats have been reclaimed through various dyking schemes which provide flood protection and regional drainage system outlets.

Due to the inherent fine soil texture, the large distances between drainage ditches and relatively level topography, on-farm land drainage is slow. To date farm scale subsurface drainage has not been used in the Creston area to improve on-farm drainage.

This project seeks to demonstrate and evalute the benefits of a well-designed subsurface drainage system in the Creston Valley. The system is to be installed with modern drainage equipment using laser grade control.

The Soils Branch conducted a soil survey of the property during the summer of 1983 to determine design criteria and recommend drain depth and spacing. Engineering Branch staff concurrently completed the topographic survey and, using the recommendations of the Soils Branch, produced a drainage system design.

The farm owner is currently negotiating installation arrangements When installation is made a drainage field day will be held.

Evaluations of the effects of drain spacing variations and observations of the benefits of drainage will be made. Expected benefits should include:

- increased crop productivity
- longer growing and harvest season
- greater cropping choice and flexibility
- potential to sub-irrigate
- improved soil structure
- increased land value

PROJECT: No. 124

EVALUATION OF LIME ADDITIONS FOR FORAGE CROP PRODUCTION IN THE CENTRAL INTERIOR

Initial evidence indicates that the addition of lime assists in the growth of forage crops in the Central Interior.

Project Supervisor:

- R. Kline, Soil Specialist, B.C. Ministry of Agriculture and Food, Prince George

Co-operators:

- Wm. van Lierop, Supervisor, Soil, Feed and Tissue Testing Laboratory, B.C. Ministry of Agriculture and Food, Kelowna
- Norman Johnson, dairy farmer, Prince George
- Alf Nunweiler, beef producer, Prince George
- Joe Ulz, beef producer, Smithers
- Larry Bell, beef producer, Quesnel
- Dave Merz, beef producer, Fort Fraser
- Floyd Jackson, beef producer, Hixon

Branch:

Soils

Funding:

83/84 - $1,800
Co-operators' contribution - land

Objectives:

1. To determine forage crop response to lime additions on several acid Central Interior soils.

2. To use the buffer pH method (SMP - buffer) to determine the lime requirement of Central Interior soils

Summary:

The development of two agricultural lime sources near Prince George has created an interest in the use of lime for crop production in the Central Interior. Trials were conducted by Agriculture Canada in the late 1950s which indicated some marginal improvements in crop yields and germination on Pineview clay soils.

Other soil types in the Central Interior appear to have the physical characteristics suitable for alfalfa production, but their pH status (5.6 - 6.0) is marginal for alfalfa. The use of lime could enhance the growth of alfalfa and possibly improve its chance of winter survival.

Two research and demonstration trials were established in 1982, and four in 1983. Four of the six plots, yielded results; two were established too late in 1983 for a crop.

In the first year the crop response to lime was:

a) Johnson Dairy Farm - inital soil pH 5.5 - Pineview clay
   - lime rate of 12.1 T/ha improved whole barley silage crop by 16%
   - lime rate of 15.1 T/ha improved whole barley silage crop by 22%

b) Nunweiler Ranch - initial soil pH 6.0 - Bednesti soil
   - lime rate of 4.5 T/ha improved whole barley silage crop by 6%

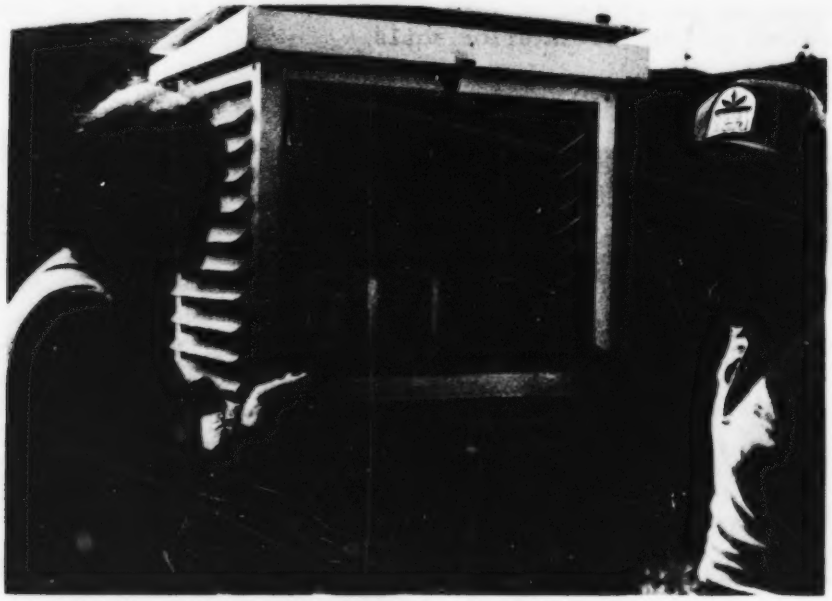
c) Bell Ranch - initial soil pH 5.3 - Saxton soil
   - lime rate of 4.5 T/ha improved whole barley silage crop by 16%
   - lime rate of 6.7 T/ha improved whole barley silage crop by 18%

c) Merz Farm - initial soil pH 5.4 - Stellako soil
   - lime rate of 3.4 T/ha improved seedling alfalfa crop yield by 12%
   - lime rate of 6.7 T/ha increased seedling alfalfa crop yield by 11%

Responses to lime in the application year can be erratic but there is some initial evidence that it has a positive impact. The trials are to be established for a minimum four-year period, at the end of which, accurate lime recommendations for Central Interior forage crops should result. Economic assessments of the data should be complete at that point. Information is being transferred to farmers through meetings and field days.

PROJECT: No. 125

THE ESTABLISHMENT OF A GRAPE VARIETY EVALUATION PLANTING ON VANCOUVER ISLAND



Thirty-two grape varieties have been planted in an observation trial on Vancouver Island. A small weather station monitors the micro-climate at the site.

Project Supervisor:

- John Vielvoye, Provincial Grape Specialist, B.C. Ministry of Agriculture and Food, Kelowna

Co-operators:

- Brent Warner, Horticulturist, B.C. Ministry of Agriculture and Food, Sidney
- D. Zanatta, land owner, Sidney

Branch:

Regional Extension Services, Okanagan-Kootenay Region

Funding:

83/84 - $1,500
84/85 - $ 550

Objectives:

Determine the suitability of 32 grape varieties to an area of Vancouver Island.

Summary:

Climate and soil survey information appears suitable for the commercial production of fresh market and winery grapes on parts of Vancouver Island. Some small scale grape production has existed in the area for many years, but observations of the plantings, and historical records that show performance are not available. Consequently, there is a lack of basic information about the varietal suitability for the area.

This problem has been addressed through the planting of a total of 32 grape varieties in an observation trial. Observations and records of these varieties will be made for a minimum of 10 years. The information will be made available on an annual basis in progress reports. Variety recommendations will be provided when the project has been completed.

All summer cabbage genotypes harvested to date had good clubroot resistance with only an occasional root with galls. A number of genotypes also have very good horticultural characteristics but final evaluation cannot be made until harvesting and evaluations have been completed and the data analyzed.

Clubroots have been collected from 25 sites for future race identification.

PROJECT: No. 126

CLUBROOT RESISTANT CULTIVAR TRIALS

Clubroots were collected from 25 sites for future determination of race.

Project Supervisors:

- Andrea Buonassisi, Pest Control Specialist, B.C. Ministry of Agriculture and Food, Victoria
- Brent Warner, District Agriculturist, B.C. Ministry of Agriculture and Food, Sidney
- Robert Harris, Research Scientist Emeritus, Agricultural Canada, Sidney

Co-operators:

- Jack Mar, vegetable grower

Branch:

Crop Protection

Funding:

May/June, 1983 - $3,250
July/August, 1983 - $3,250

Objectives:

1. To evaluate clubroot resistant cabbage and broccoli genotypes for resistance and suitability for commercial production

2. To collect and freeze clubroot galls from commercial fields for future determination of race

Summary:

A federal ban on potato growing in Central Saanich because of golden nematode infestation has forced growers to seek alternate crops. Cole crops could be a good alternative if it were not for clubroot, a serious soil fungus disease present in the area.

Four broccoli and 15 cabbage genotypes were planted in a six replicated test on clubroot infected land and another 15 cabbage were interplanted in the plot for observation. Heads were harvested when matured and rated for horticultural suitability and clubroot using a 0 - 8 scale.

Broccoli genotypes 82-10 and 82-12 had excellent clubroot resistance (less than 0.4 rating) and generally good horticultural characteristics. Both genotypes are probably inferior to many cultivars currently grown in uninfested soil but merit further trials in soil where clubroot is a problem.

PROJECT: No. 127

TO APPLY INTEGRATED INSECT AND DISEASE PEST MANAGEMENT TO POTATO PRODUCTION

Potatoes are examined for signs of flea beetles while the apparatus in the foreground is gathering data used in blight forecasting.

Project Supervisors:

- Henry S. Gerber, Entomologist, and David Ormrod, Plant Pathologist, B.C. Ministry of Agriculture and Food, Cloverdale

Co-operators:

- Barbara Mulock, Pest Management Centre, Simon Fraser University, Burnaby
- Robert Vernon, Research Scientist, Agriculture Canada, Vancouver
- B.C. Coast Vegetable Co-operative
- Ray Atchison, Paul Garvin and Hugh Reynolds, potato growers

Branch:

Crop Protection

Funding:

1983 - $8,700

Objectives:

1. To introduce insect and disease monitoring and forecasting principles to potato growers in the Lower Fraser Valley.

2. To evaluate insect-monitoring methods for the major insect pests of potatoes in terms of the ability to reduce overall spraying costs without increase of crop damage or reduction of yield

3. To evaluate spray recommendations and late blight control based on late blight forecasting principles.

Summary:

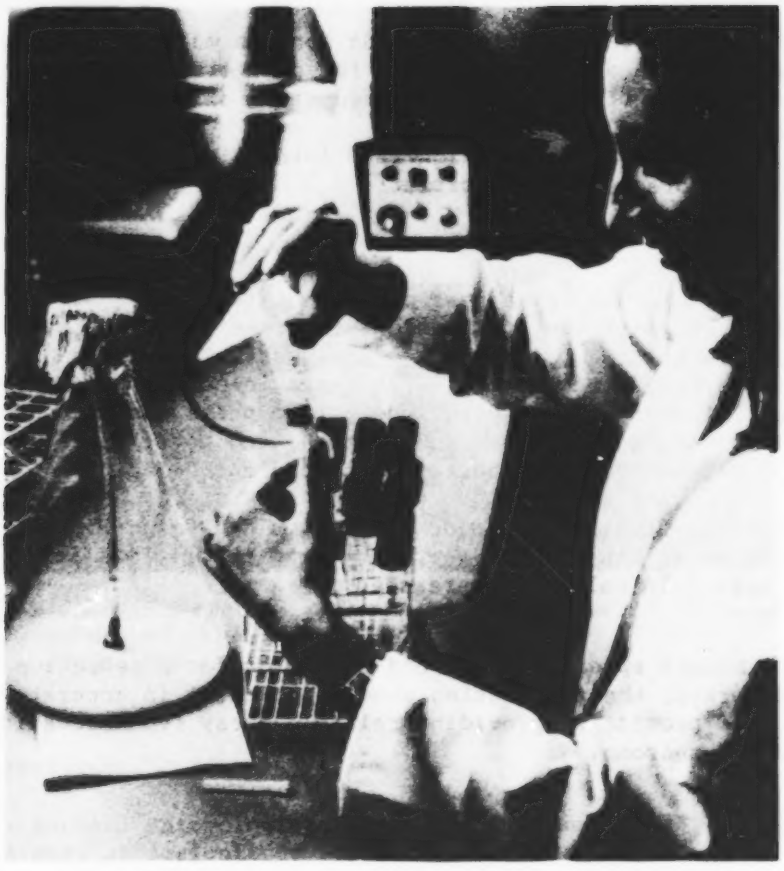
Integrated insect and disease pest management is concerned with the proper timing of pesticide applications in order to maximize their effect while reducing their number and hence the cost. This principle has been successfully applied to control insect pests in carrots and onions and the potential for expansion to include potato pests was examined. Tuber flea beetle and aphid numbers were monitored and potato late blight forecasting was evaluated in Surrey, Richmond and Delta.

Results indicated that insecticide sprays could be significantly reduced, and in one case eliminated, by sampling field populations and spraying only when threshold values were reached.

Potato late blight spread in 1983 did not allow for a reduction in total numbers of sprays, the forecasting showed potential in accurate blight prediction and promise in providing reliable spray recommendations in future growing seasons.

PROJECT: No. 130

POULTRY HEALTH PROGRAM



At the serological monitoring laboratory the efficiency of the vaccination program in poultry flocks will be assessed.

Project Supervisor:

- Dr. H.C. Carlson, Director, Poultry Branch, B.C. Ministry of Agriculture and Food, Victoria

Co-operators:

- Dr. R.J. Avery, Director, Veterinary Branch, B.C. Ministry of Agriculture and Food, Victoria
- Dr. John Robinson, Avian Pathologist, Veterinary Pathology Laboratory, B.C. Ministry of Agriculture and Food, Abbotsford
- Dr. R.C. Hopkins, Avian Disease Veterinarian, B.C. Ministry of Agriculture and Food, Abbotsford
- H. Gasperdone, Broiler Specialist, B.C. Ministry of Agriculture and

Food, Abbotsford
- B.C. Chicken Marketing Board, Cloverdale,

Branch:

Poultry Branch
Veterinary Branch

Funding:

82/83 - DATE $17,500
82/83 - B.C. Chicken Marketing Board $60,000

Objectives:

In co-operation with the poultry industry to establish a serological monitoring laboratory to determine the efficiency of vaccination programs in broiler flocks and commercial flocks and, as well, monitor these flocks and the premises for the presence of pathogenic bacteria i.e. salmonella.

Summary:

Financial losses of close to $2 million annually are incurred by the poultry industry due to the incidence of disease in breeder flocks. The establishment of blood sampling services and a supervised vaccination program could cut these losses.

A laboratory was constructed at the Poultry Test Station, Abbotsford using funds provided by the B.C. Chicken Marketing Board. Equipment was purchased from DATE funds and staff was hired by the Board. Supplies were provided from Poultry and Veterinary Branch budgets and the laboratory became functional in June, 1983.

Registration of broiler breeder flocks, at one day of age, and sampling of these flocks for the presence of bacteria and antibodies against mycoplasma species was initiated on September 1, 1983. It is estimated that the laboratory will test approximately 100 flocks each year from some 30 premises. This will be an ongoing program and will be funded annually by the B.C. Chicken Marketing Board and ministry budgets.

Queen's Printer for British Columbia ©
Victoria, 1983

M80-312

BRITISH COLUMBIA MINISTRY OF AGRICULTURE AND FOOD OFFICES

Abbotsford:	205 - 33780 Laurel Street V2S 1X4	859-5281
	Engineering Branch, 33832 South Fraser Way V2S 2C5	853-6451
	Poultry Test Station, 32916 Marshall Road V2S 1K2	853-3671
	Veterinary Laboratory, Box 100 V2S 4N8	853-1161
Burnaby:	Dairy Laboratory, 3705 Willingdon Ave. V5G 3H3	434-3326
Chilliwack:	5 - 8635 Young Road South V2P 4P3	795-9471
Cloverdale:	17720 - 57th Avenue, Surrey V3S 4P9	576-2911
Courtenay:	209 - 420 Cumberland Road V9N 5M6	338-7465
Cranbrook:	202 - 135 10th Avenue South V1C 2N1	489-3521
Creston:	456 Northwest Boulevard V0B 1G0	428-5371
Dawson Creek:	1201 - 103rd Avenue V1G 4J2	782-5931
Duncan:	238 Government Street V9L 1A5	746-6183
Fort St. John:	201 - 9711 100th Avenue V1J 1Y2	787-1111
	Crop Insurance Branch, 221 - 9711 100th Avenue V1J 1Y2	787-1111
Kamloops:	162 Oriole Road V2C 4N7	374-3614
Kelowna:	1873 Spall Road V1Y 4R2	860-3588
Langley:	210 - 20316 56th Avenue V3A 3Y7	530-5381
Oliver:	Court House, Box 940 V0H 1T0	498-2420
Penticton:	10 - 477 Martin Street V2A 5L2	493-2749
Prince George:	Experimental Farm Site, R.R. #8, RMD 7, V2N 4M6	963-9685
Quesnel:	208 - 350 Barlow Avenue V2J 2C1	992-5591
Salmon Arm:	Samara Building, Box 639 V0E 2T0	832-2088
Sidney:	Bldg. 20, Saanichton Research Station, 8801 E. Saanich Rd. V8L 1H3	656-0941
Smithers:	Government Building, Bag 5000 V0J 2N0	847-4411
Summerland:	Research Station, Box 198 V0H 1Z0	494-0401
Surrey:	Marketing Branch 10344 East Whalley Ring Road V3T 4H4	584-7691
Vanderhoof:	Church Avenue, Box 987 V0J 3A0	567-2111
Vernon:	4607 - 23rd Street V1T 4K7	545-1387
Victoria:	Minister's Office, Parliament Buildings V8W 1X4	387-3656
	Head Office, 808 Douglas Street V8W 2Z7	387-5121
Williams Lake:	540 Borland Street V2G 1R8	392-6261